REMARKS

Claims 1-13 and 15-21 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-10, 13, 15-17, and 21 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster et al. (U.S. Pub. No. 2002/0181395) in view of Dell et al. (U.S. Pub. No. 2002/0085578) and further in view of Karp (U.S. Pat. No. 5,469,154).

Claims 11, 12, and 18-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster et al. (U.S. Pub. No. 2002/0181395) in view of Dell et al. (U.S. Pub. No. 2002/0085578) and Karp (U.S. Pat. No. 5,469,154), and further in view of Brahmaroutu (U.S. Pub. No. 2003/0033427).

These rejections are respectfully traversed.

Claim 1 recites "the packing algorithm circuit configured to ... receive the traffic pattern request from each of the plurality of packet sources in a predetermined time window; and compute an actual traffic pattern for the packet based on the received network topology data and all the received traffic pattern requests[.]"

The Examiner acknowledges that Foster fails to teach the above features, but asserts that one of ordinary skill in the art would be motivated to modify Foster based on the teaching of Dell to arrive at the above features. Applicant respectfully traverses the Examiner's assertion.

Foster at best appears to show a Virtual Identifier (VI) Network Interface Controller (NIC) that receives an indication that a data communication to one or more remote nodes is to occur. The VI NIC will register the communication with a network manager for the network, and will receive an appropriate transmittal virtual identifier to be used for that communication from the network manager. Foster also states:

> [i]n some embodiments in which virtual identifiers are assigned to paths through a network, the assignment of paths to such virtual path identifiers is performed in a dynamic fashion after an indication is received that a data communication is to occur, such as by the network manager upon receipt of a data communication registration. The assigning of a virtual path identifier to a path can include the configuring of each of one or more intermediate routing devices (e.g., routers or switches) between the source and the destination, such as by the network manager, so that when one of the routing devices receives a data communication that includes the virtual identifier it will forward the communication in an appropriate manner either directly to the destination or instead to a next routing device along the path that is similarly configured.

Foster, para. [0048]. In addition, Fig. 7 and paras. [0093]-[0095], which are specifically cited by the Examiner, at best appear to show a subroutine that receives indications of incoming data communications and forwards those data communication to <u>appropriate local destinations</u> such as an executing application at a node, rather than a subroutine that routes the data communication to another node.

Dell at best appears to show a three-stage (input, switching, and output) switching network. One or more input devices in the input stage may bid to use a crossbar device in the switching stage. “In each crossbar device, [a] bid arbitrator determines whether to accept or reject each received bid, resolving any collisions with other bids received from other input devices.” Para. [0114]. In determining whether to grant a bid, the bid arbitrator considers priority of the bids it received and whether the cross bar device or the output device is congested.

Thus, even if one of ordinary skill in the art can be motivated to combine Foster and Dell, one at best can modify the VI NIC of Foster to employ a bid arbitrator based on the teaching of Dell. For example, if an VI NIC receives two or more indications for communications competing for the same resources from more than one requesting node (such as where, in response to the indications, the requesting nodes should be assigned the same transmission path via the same virtual identifier by the VI NIC), the alleged modified VI NIC then employs the bid arbitrator to accept or reject the indications and send the virtual identifier to a single winning requesting node. However, the transmission path can still only be determined, as shown in Foster, based on the single winning requesting (source) node, the destination node, and the determined Quality of Service level. One of ordinary skill in the art <u>would not be motivated to</u>, and <u>also cannot</u>, modify Foster based in the teaching of Dell to arrive at a technique that determines a transmission path <u>based on all in indications for communications received</u>. This is because one of ordinary skill in the art at best can learn a bidding mechanism that can be utilized to pick a winning node from many requesting nodes; nothing in Dell can teach one to consider determining <u>a transmission path based</u> on all the received indications. Therefore, one or ordinary skill in the art cannot arrive at features analogues to "<u>comput[ing] an actual traffic pattern</u> for the packet <u>based on</u> the received network topology data and <u>all the received traffic pattern requests</u>" as asserted by the Examiner.

Further, claim 1 requires that "the network is able to operate as a strictly non-interfering network." The Examiner acknowledges the Foster and Dell fails to teach the above limitations, but asserts that one of ordinary skill in the art would be motivated to

modify Foster and Dell based on the teaching of Karp to arrive at the above limitations. Specifically, the Examiner asserts that "It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Foster et al. using the features, as taught by Karp, in order to provide a wide-sense non-blocking connecting path between input and output ports (Karp: see Abstract)." See p. 5 of the outstanding Office action.

Applicant respectfully traverses the Examiner's assertion. Applicant has studied Karp carefully and submits that Karp at best appears disclose a <u>non-blocking</u> network. Karp appears silent about operating a <u>strictly non-interfering network</u>. Applicant respectfully requests the Examiner to further articulate the basis the rejection.

Applicant's Specification states

> [0024] A non-interfering network (i.e. a network without interference) is a network for which the performance degradation for any admissible traffic pattern is guaranteed to conform to a pre-specified bound. This bound can be either deterministic or statistical. For example, a network can be deemed non-interfering if the worst-case end-to-end latency is guaranteed to be less than ten microseconds. This is an example of a deterministic bound. As another example, a network can be deemed non-interfering if 99% of packets experience network latencies of less than two microseconds. This is an example of a statistical bound. These are just examples and are not limiting of the invention. The appropriate choice for a pre-specified bound is application specific, and a network supporting multiple applications can impose different bounds on performance on each traffic type.
>
> [0025] <u>A strictly non-interfering network (SNIN) is a network for which the only queuing delays experienced by an admissible traffic pattern are attributable to the multiplexing of packets from slow links onto a faster link whose aggregate bandwidth at least equals the sum of the bandwidths of the smaller links</u>. In a SNIN, competing traffic sources do not attempt to use the same network resources at the same time. The implementation of a SNIN requires that resources be dedicated through the network in support of an active communication session. In order to accomplish this, non-blocking networks can be used.

> [0026] <u>A network is non-blocking if it has adequate internal resources to carry out all possible admissible traffic patterns</u>. There are different degrees of non-blocking performance based upon the sophistication of the control policy required to achieve non-blocking performance.
>
> [0027] Most network switching applications allow the establishment of new connections and the tear down of old ones. It is possible that for a network with a non-blocking topology, a new connection can be blocked due to poor or unfortunate assignment of previously established connections. <u>A strictly non-blocking network is a network for which any new admissible connection may be accepted independent of the state of preexisting connections, or the policy used to reroute preexisting connections, without changing the routes of the preexisting connections</u>. A crossbar network is an example of a strictly non-blocking network. As another example, a rearrangably non-blocking network is a network that may be augmented by a mechanism to reroute preexisting connections such that it is possible to carry the preexisting connections and any new admissible connection.

Applicant's Substitute Specification of December 28, 2007, paras. [0024]-[0027] (emphasis added). The above paragraphs explain the difference between <u>a strictly non-blocking network</u> and <u>a strictly non-interfering network</u>. To emphasize, a strictly non-blocking network is a network for which any new admissible connection may be accepted independent of the state of preexisting connections, or the policy used to reroute preexisting connections, without changing the routes of the preexisting connections. A strictly non-interfering network (SNIN) is a network for which the only queuing delays experienced by an admissible traffic pattern are attributable to the multiplexing of packets from slow links onto a faster link whose aggregate bandwidth at least equals the sum of the bandwidths of the smaller links. In other words, a non-blocking network <u>does not by itself operate as a strictly non-interfering network</u>. For example, a strictly non-blocking network may still allow queuing the competing packets to be switched at a switching node as long as "any new admissible connection may be accepted independent of the state of preexisting connections, or the policy used to

reroute preexisting connections, without changing the routes of the preexisting connections."

The above points are further evidenced by Dell, the reference cited by the Examiner. Dell states

> [0006] In non-blocking switch fabrics, user data received from any particular source 102 can be routed through switch fabric 100 to any particular destination 110, <u>independent of whether any other user data is being routed from one or more other sources towards one or more other destinations through switch fabric 100</u>. <u>When packets of user data transmitted from the sources are received at an input port of input stage 104, the user data is buffered for eventual transmission through switching stage 106 to output stage 108, where the routed user data is again buffered for eventual transmission to the destination via an output port of the output stage associated with that destination</u>.

Dell, para. [0006] (emphasis added). In short, non-blocking switch fabrics may still allow competing packets to be buffered in a situation other than multiplexing of packets from slow links onto a faster link whose aggregate bandwidth at least equals the sum of the bandwidths of the smaller links.

Further, Foster shows a technique that aims to provide a VI NIC that can be employed by any given network in order to ensure the quality of service of that network without changing the general structure of any existing network. Karp, on the other hand, teaches a non-blocking network that has exactly three-stage of switches. Thus, in order to utilize the technique of Karp, one of ordinary skill in the art must changes a network in Foster to the three-stage network as required by Karp. Applicant submits that such a modification would defeat the purpose of Foster, because Foster recognizes "the complexity and volume of Internet traffic. Because of this traffic and its business potential, a growing number of companies are building businesses around the Internet and developing mission-critical business applications to be provided by the Internet."

Para. [0003]. Therefore, one of ordinary skill in the art would not modify the technique shown in Foster to require the complex business network be changed to a simple three-stage network structure as shown in Karp.

In view of the foregoing, Applicant submits that claim 1 and its dependent claims 2-7 define over the art cited by the Examiner. Likewise, claim 8 and its dependent claims 9-12 as well as claim 13 and its dependent claims 14-21 define over the art cited by the Examiner.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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